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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/196,161	11/20/1998	YOKE MIN SIN	1459-005B	8822

22429 7590 07/15/2005

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EXAMINER	
MINNIFIELD, NITA M	

ART UNIT	PAPER NUMBER
1645	

DATE MAILED: 07/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/196,161	SIN ET AL.	
	Examiner	Art Unit	
	N. M. Minnifield	1645	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 February 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *33-49* is/are pending in the application.

4a) Of the above claim(s) *47 and 48* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *33-46 and 49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *47 and 48* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicants' amendments filed April 20, 2005 and February 7, 2005 are acknowledged and have been entered. Claims 1-32 have been canceled. New claims 33-49 have been added. Claims 33-49 are now pending in the present application. All rejections have been withdrawn in view of Applicants' amendment to the claims and/or comments, with the exception of those discussed below.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Newly submitted claims 47 and 48 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 47 and 48 are directed to a method for immunizing fish against ciliated ectoparasitic protozoans (these claims would have been grouped with Invention II of the original restriction requirement mailed 3/6/00), which is different from the originally elected invention of a vaccine (see response to election filed 3/24/00) now set forth in new claims 33-46 and 49.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 47 and 48 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

4. Claims 33-46 and 49 and elected species SEQ ID NO: 1 will be examined in the pending application.

5. Claim 49 is objected to because of the following informalities: method claim 49 depends from product claim 42. Appropriate correction is required.

6. Claims 33-46 and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Clark et al 1992 (PNAS USA, July 1992, 89:6363-6367).

The claims are directed to a vaccine for immunizing fish against ciliated ectoparasitic protozoans comprising an effective amount of a fusion protein (GST-iAgI) expressed from a recombinant DNA sequence for immobilization antigen, repeat I of *Ichthyophthiirus multifiliis* wherein said sequence is SEQ ID NO: 1 and a medium comprising at least one of buffers, antigens, immunostimulants or carriers. The vaccine, when injected into a fish, provides effective protection against white spot disease caused *Ichthyophthiirus multifiliis*. The fusion protein is produced using *E. coli.*

Clark et al discloses the expression of the immobilization antigen (i.e. iAgI); the cDNA encode a protein of 394 amino acids with a tandemly repeated structure characteristic of the i-antigen of other ciliated parasites (abstract). Clark et al discloses that the immobilization antigens of *I. multifiliis* are analogous to free-living ciliates and parasitic protozoa; and "...that transcript levels increase in parallel with the infectivity of the organism bears on the functional role in this system and is consistent with previous observations suggesting that the i-antigens of *Ich* are involved in the development of protective immunity in fish. (p.

6363, col. 2; see also p. 6367, col. 2). The materials and methods disclose how to obtain a recombinant immobilization antigen (p. 6363-6365). Clark et al discloses the entire amino acid sequence as set forth in SEQ ID NO: 1 (see figure 1). Clark et al discloses "on a more applied level, because the i-antigens of *Ich* interact with the immune system of fish, they have potential as protective immunogens and may be of practical use in the treatment of a pathogen with major impact on aquaculture worldwide." (p. 6367, col. 2).

It is noted that the prior art does not specifically recite a medium (buffer, adjuvant, immunostimulant, or carrier). However, it would be inherent that a vaccine composition would comprise a buffer, adjuvant or carrier of some kind, since the art discloses the use of the antigen in a vaccine for protection against disease.

Since the Patent Office does not have the facilities for examining and comparing applicants' vaccine with the vaccine of the prior art reference, the burden is upon applicants to show a distinction between the material structural and functional characteristics of the claimed vaccine and the vaccine of the prior art. See In re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and In re Fitzgerald et al., 205 USPQ 594.

The rejection of claims 33-46 and 49 (previously 1-8 and 24) under 35 U.S.C. § 102(b) as anticipated by Clark et al 1992 (PNAS USA, July, 1992, 89:6363-6367) is maintained. This rejection is maintained for essentially the same reasons as the rejection of claims 1-8 and 24 under this statutory provision, as set forth in the last Office action. Applicants' arguments filed February 7, 2005 have been fully considered but they are not deemed to be persuasive.

Applicants have asserted that Clark et al would not place one skilled in the art in possession of the present invention. Applicants have asserted that the reference fails to disclose or suggest the formation of a vaccine for immunizing fish against ciliated ectoparasitic protozoans. However, it is noted that the claims are directed to products, a composition comprising the immobilization antigen repeat I of *Ichthyophthiirus multifiliis* and a medium (i.e. a buffer), which the prior art discloses. The prior art discloses the claimed composition comprising the antigen (see materials and methods and figure 1) and a buffer (i.e. SDS buffer).

With regard to Applicants' argument that the prior art does not demonstrate the effectiveness of the vaccine, its application in fish, it is noted that the claimed invention is a product and the recitation of vaccine "for immunizing fish against ciliated ectoparasitic protozoans" is viewed as intended use. The recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 312 F.2d 937, 939, 136 USPQ 458, 459 (CCPA 1963). It would appear that the composition of Clark et al would achieve this function since the prior art discusses such a function or intended use. The function is inherent. Products of identical chemical composition cannot have mutually exclusive properties. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant

discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990)

Applicants have asserted that the fusion protein of the present vaccine is expressed from a recombinant DNA sequence from the immobilization antigen, repeat I of *Ichthyophthiirus multifiliis* and that the overall sequence of the overall recombinant DNA sequence (SEQ. ID No. 1) is different from the sequence of Figure 1 of Clark et al. Hence, the fusion protein used in the present vaccine could not be the same as that of Clark et al. even if the two proteins are both considered to exhibit the same function, i.e., to agglutinate the ciliated protozoan. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., to agglutinate the ciliated protozoan) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

With regard to the sequence of SEQ ID NO: 1, it is noted that the entire claimed sequence is set forth in the prior art of Clark et al, see figure 1 and the sequence search result printout that is attached to this office action. Further, the recitation of "is expressed from recombinant DNA..." and other process claim language as recited in claims 37, 42 and 43 are viewed as process limitations. The lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps, which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to

be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith." In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972) Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

Applicants have asserted that Clark et al fails to provide any description or enablement of how any vaccine could be prepared. However, the claimed invention is a composition, which components are disclosed in the prior art of Clark et al. Further, Clark et al discloses that the that the immobilization antigens are involved in the development of protective immunity in fish as well as the preparation of recombinantly expressed immobilization antigen from the same source as claimed by Applicants. Applicants have not provided any evidence to suggest that the composition of Clarke et al, which has the same components as Applicants' composition, would not function in the same manner as the claimed composition.

7. No claims are allowed.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. M. Minnifield whose telephone number is 571-272-0860. The examiner can normally be reached on M-F (8:00-5:30) Second Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynette R.F. Smith can be reached on 571-272-0864. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

N. M. Minnifield
Primary Examiner
Art Unit 1645

NMM
August 30, 2004

Pls, mail w/ attached action

GenCore version 5.1.6
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OM protein - protein search, using sw model

Run on: June 30, 2005, 02:08:15 ; Search time 93 Seconds
(without alignments)
578.154 Million cell updates/sec

Title: US-09-196-161D-1
Perfect score: 558
Sequence: 1 GAAQGEANGNQPFAANNAAR.....PQGEAPGVQVFAAGAAAAGV 105

Scoring table: BLOSUM62
Gapop 10.0 , Gapext 0.5

Searched: 1612378 seqs, 512079187 residues

Total number of hits satisfying chosen parameters: 1612378

Minimum DB seq length: 0
Maximum DB seq length: 2000000000

Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries

Database : UniProt_03:*
1: uniprot_sprot:*
2: uniprot_trembl:*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

Result No.	Score	% Query Match	Length	DB	ID	Description
1	558	100.0	395	2	Q27208	Q27208 ichthyophth
2	558	100.0	442	2	Q9XZG2	Q9xzg2 ichthyophth
3	222	39.8	460	2	Q962N5	Q962n5 ichthyophth
4	221	39.6	468	2	Q9BMH3	Q9bmh3 ichthyophth
5	93.5	16.8	371	2	Q9GPP0	Q9gpp0 tetrahymena
6	93	16.7	548	2	Q9GQ45	Q9gq45 giardia lam
7	93	16.7	677	2	Q7M3R4	Q7m3r4 giardia lam
8	88.5	15.9	305	2	Q9GPP2	Q9gpp2 tetrahymena
9	88.5	15.9	316	2	Q9GPP3	Q9gpp3 tetrahymena
10	87	15.6	724	2	Q7QTU1	Q7qtu1 giardia lam
11	85.5	15.3	518	2	Q8GIR8	Q8gir8 synechococc
12	85	15.2	316	2	Q9GPP4	Q9gpp4 tetrahymena
13	85	15.2	536	2	Q7QSX6	Q7qsx6 giardia lam
14	85	15.2	692	2	Q8I8W4	Q8i8w4 giardia lam
15	85	15.2	692	2	Q7QQ73	Q7qq73 giardia lam
16	84.5	15.1	245	2	Q7QQC5	Q7qqc5 giardia lam
17	84.5	15.1	2330	1	EFL4_MOUSE	P60882 mus musculu
18	84.5	15.1	2386	1	EFL4_HUMAN	Q7z7m0 homo sapien
19	83	14.9	1190	2	Q8HZI9	Q8hzi9 equus cabal
20	81.5	14.6	814	2	Q7R1V1	Q7r1v1 giardia lam
21	81	14.5	130	2	Q9BIK1	Q9bik1 giardia lam
22	81	14.5	1827	2	Q8JHV6	Q8jhv6 brachydanio
23	80.5	14.4	560	2	Q9U013	Q9u013 giardia lam
24	80	14.3	338	2	Q6EQJ7	Q6eqj7 oryza sativ
25	79.5	14.2	874	1	EFL4_RAT	Q9qyp0 rattus norv
26	79.5	14.2	1019	2	Q9NA40	Q9na40 caenorhabdi
27	79	14.2	155	2	Q88BJ0	Q88bj0 pseudomonas
28	79	14.2	600	2	Q9PVK7	Q9pvk7 naja naja (
29	79	14.2	3333	1	LMA3_MOUSE	Q61789 mus musculu
30	78.5	14.1	239	2	Q7R376	Q7r376 giardia lam
31	78.5	14.1	821	2	Q8VPM9	Q8vpm9 micrococcus
32	78	14.0	596	2	Q07317	Q07317 giardia lam
33	78	14.0	833	2	Q6J288	Q6j288 acanthamoeb
34	78	14.0	3718	1	LMA5_MOUSE	Q61001 mus musculu
35	77.5	13.9	484	2	Q95LG2	Q95lg2 ovis aries
36	77.5	13.9	569	2	Q7QXT3	Q7qxt3 giardia lam
37	77.5	13.9	573	2	Q9HWQ0	Q9hwq0 pseudomonas
38	77.5	13.9	1997	2	Q8LRM7	Q8lrm7 chlamydomon
39	77.5	13.9	3467	2	Q8I218	Q8i218 plasmodium
40	77	13.8	166	2	Q9BIK0	Q9bik0 giardia lam
41	77	13.8	424	1	ASP_ANCCA	Q16937 ancylostoma
42	77	13.8	424	2	Q9XZ41	Q9xz41 ancylostoma
43	77	13.8	776	2	Q7QTG0	Q7qtg0 giardia lam
44	77	13.8	1372	2	P91526	P91526 caenorhabdi
45	77	13.8	1546	2	O75445	O75445 homo sapien

ALIGNMENTS

RESULT 1
Q27208
ID Q27208 PRELIMINARY; PRT; 395 AA.
AC Q27208;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT 01-MAR-2004 (TrEMBLrel. 26, Last annotation update)
DE Immobilization antigen precursor (Fragment).
OS Ichthyophthirius multifiliis (White spot) (Ich).
OC Eukaryota; Alveolata; Ciliophora; Oligohymenophorea; Hymenostomatida;
OC Ophryoglenina; Ichthyophthirius.
OX NCBI_TaxID=5932;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Georgia;
RX MEDLINE=92335298; PubMed=1631132;
RA Clark T.G., McGraw R.A., Dickerson H.W.;
RT "Developmental expression of surface antigen genes in the parasitic
RT ciliate Ichthyophthirius multifiliis.";
RL Proc. Natl. Acad. Sci. U.S.A. 89:6363-6367(1992).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=Georgia;
RX MEDLINE=93020590; PubMed=1383510;
RA Lin T.L., Dickerson H.W.;
RT "Purification and partial characterization of immobilization antigens
RT from Ichthyophthirius multifiliis.";
RL J. Protozool. 39:457-463(1992).
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=Georgia;
RA Clark T.;
RL Submitted (SEP-1998) to the EMBL/GenBank/DDBJ databases.
DR EMBL; M92907; AAC36158.1; -.
DR PIR; A46031; A46031.
DR GO; GO:0005489; F:electron transporter activity; IEA.
DR GO; GO:0005506; F:iron ion binding; IEA.
DR GO; GO:0006118; P:electron transport; IEA.
DR InterPro; IPR001450; 4Fe4S_ferredoxin.
DR InterPro; IPR009030; Grow_fac_recept.
DR PRINTS; PR00353; 4FE4SFRDOXIN.
KW Signal.
FT NON_TER 1 1
FT SIGNAL <1 1
FT CHAIN 2 395 immobilization antigen.
SQ SEQUENCE 395 AA; 39567 MW; 68DA2C790E4FD393 CRC64;

Query Match 100.0%; Score 558; DB 2; Length 395;
Best Local Similarity 100.0%; Pred. No. 8.6e-48;
Matches 105; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 GAAQGEANGNQPFAANNAARGICVPCQINRVGSVTNAGDLATLATQCSTQCPTGTALDDG 60
Db 37 GAAQGEANGNQPFAANNAARGICVPCQINRVGSVTNAGDLATLATQCSTQCPTGTALDDG 96

Pls mail w/ attached Acts
MM

```
Qy         61 VTDVFDRSAAQCVKCKPNFYYNGGSPQGEAPGVQVFAAGAAAAGV 105
              ||||||||||||||||||||||||||||||||||||||||||||||
Db         97 VTDVFDRSAAQCVKCKPNFYYNGGSPQGEAPGVQVFAAGAAAAGV 141


RESULT 2
Q9XZG2
ID   Q9XZG2      PRELIMINARY;      PRT;   442 AA.
AC   Q9XZG2;
DT   01-NOV-1999 (TrEMBLrel. 12, Created)
DT   01-NOV-1999 (TrEMBLrel. 12, Last sequence update)
DT   01-MAR-2004 (TrEMBLrel. 26, Last annotation update)
DE   Immobilization antigen precursor.
GN   Name=IAG48;
OS   Ichthyophthirius multifiliis (White spot) (Ich).
OC   Eukaryota; Alveolata; Ciliophora; Oligohymenophorea; Hymenostomatida;
OC   Ophryoglenina; Ichthyophthirius.
OX   NCBI_TaxID=5932;
RN   [1]
RP   SEQUENCE FROM N.A.
RX   MEDLINE=99196987; PubMed=10095108; DOI=10.1016/S0378-1119(99)00029-3;
RA   Clark T.G., Lin T.L., Jackwood D.A., Sherrill J., Lin Y.,
RA   Dickerson H.W.;
RT   "The gene for an abundant parasite coat protein predicts tandemly
RT   repetitive metal binding domains.";
RL   Gene 229:91-100(1999).
RN   [2]
RP   SEQUENCE FROM N.A.
RX   MEDLINE=99260648; PubMed=10331805;
RA   Gaertig J., Gao Y., Tishgarten T., Clark T.G., Dickerson H.W.;
RT   "Surface display of a parasite antigen in the ciliate Tetrahymena
RT   thermophila.";
RL   Nat. Biotechnol. 17:462-465(1999).
DR   EMBL; AF140273; AAD31283.1; -.
DR   GO; GO:0005489; F:electron transporter activity; IEA.
DR   GO; GO:0005506; F:iron ion binding; IEA.
DR   GO; GO:0006118; P:electron transport; IEA.
DR   InterPro; IPR001450; 4Fe4S_ferredoxin.
DR   InterPro; IPR009030; Grow_fac_recept.
DR   PRINTS; PR00353; 4FE4SFRDOXIN.
KW   Signal.
FT   SIGNAL        1     20       Potential.
FT   CHAIN        21    442       immobilization antigen.
SQ   SEQUENCE   442 AA;  45025 MW;  52658F3F65D27AFA CRC64;

  Query Match             100.0%;  Score 558;  DB 2;  Length 442;
  Best Local Similarity   100.0%;  Pred. No. 9.6e-48;
  Matches  105;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps    0;

Qy          1 GAAQGEANGNQPFAANNAARGICVPCQINRVGSVTNAGDLATLATQCSTQCPTGTALDDG 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         56 GAAQGEANGNQPFAANNAARGICVPCQINRVGSVTNAGDLATLATQCSTQCPTGTALDDG 115

Qy         61 VTDVFDRSAAQCVKCKPNFYYNGGSPQGEAPGVQVFAAGAAAAGV 105
              |||||||||||||||||||||||||||||||||||||||||||||
Db        116 VTDVFDRSAAQCVKCKPNFYYNGGSPQGEAPGVQVFAAGAAAAGV 160


RESULT 3
Q962N5
ID   Q962N5      PRELIMINARY;      PRT;   460 AA.
AC   Q962N5;
DT   01-DEC-2001 (TrEMBLrel. 19, Created)
DT   01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT   01-MAR-2004 (TrEMBLrel. 26, Last annotation update)
DE   52kDa immobilization antigen variant B protein.
OS   Ichthyophthirius multifiliis (White spot) (Ich).
OC   Eukaryota; Alveolata; Ciliophora; Oligohymenophorea; Hymenostomatida;
OC   Ophryoglenina; Ichthyophthirius.
OX   NCBI_TaxID=5932;
RN   [1]
RP   SEQUENCE FROM N.A.
RX   MEDLINE=21839613; PubMed=11849709; DOI=10.1016/S0166-6851(01)00436-4;
RA   Lin Y., Lin T.L., Wang C.C., Wang X., Stieger K., Klopfleisch R.,
RA   Clark T.G.;
RT   "Variation in primary sequence and tandem repeat copy number among i-
RT   antigens of Ichthyophthirius multifiliis.";
RL   Mol. Biochem. Parasitol. 120:93-106(2002).
DR   EMBL; AF405431; AAK94941.1; -.
DR   GO; GO:0005489; F:electron transporter activity; IEA.
DR   GO; GO:0005506; F:iron ion binding; IEA.
DR   GO; GO:0006118; P:electron transport; IEA.
DR   InterPro; IPR001450; 4Fe4S_ferredoxin.
DR   InterPro; IPR009030; Grow_fac_recept.
DR   PRINTS; PR00353; 4FE4SFRDOXIN.
SQ   SEQUENCE   460 AA;  47535 MW;  55DB1FB3C62F2371 CRC64;

  Query Match             39.8%;  Score 222;  DB 2;  Length 460;
  Best Local Similarity   45.8%;  Pred. No. 5.7e-14;
  Matches   44;  Conservative   12;  Mismatches   36;  Indels    4;  Gaps    2;

Qy          1 GAAQGEANGNQPFAANNAARGICVPCQINRVGSVTNAGDLATLATQCSTQCPTGTALDDG 60
              |   |:| |  |   |     |: ||::: |    |  | || |||  || |||::||
Db         56 GNPAGQAPGAVQF---NPGVSQCIACQVHKADSQHRQGGDANLAAQCSNLCPAGTAVEDG 112

Qy         61 VTDVFDRSAAQCVKCKPNFYYNGGSPQGEAPGVQVF 96
                : | :|  ||| |||||:|||:| |:|||   |
Db        113 -SPTFTQSLTQCVNCKPNFYFNGGNPTGQAPGAGQF 147


RESULT 4
Q9BMH3
ID   Q9BMH3      PRELIMINARY;      PRT;   468 AA.
AC   Q9BMH3;
DT   01-JUN-2001 (TrEMBLrel. 17, Created)
DT   01-JUN-2001 (TrEMBLrel. 17, Last sequence update)
DT   01-MAR-2004 (TrEMBLrel. 26, Last annotation update)
DE   Immobilization antigen isoform.
GN   Name=IAG52A;
OS   Ichthyophthirius multifiliis (White spot) (Ich).
OC   Eukaryota; Alveolata; Ciliophora; Oligohymenophorea; Hymenostomatida;
OC   Ophryoglenina; Ichthyophthirius.
OX   NCBI_TaxID=5932;
RN   [1]
RP   SEQUENCE FROM N.A.
RX   MEDLINE=21839613; PubMed=11849709; DOI=10.1016/S0166-6851(01)00436-4;
RA   Lin Y., Lin T.L., Wang C.C., Wang X., Stieger K., Klopfleisch R.,
RA   Clark T.G.;
RT   "Variation in primary sequence and tandem repeat copy number among i-
RT   antigens of Ichthyophthirius multifiliis.";
RL   Mol. Biochem. Parasitol. 120:93-106(2002).
DR   EMBL; AF324424; AAK01661.1; -.
DR   GO; GO:0005489; F:electron transporter activity; IEA.
DR   GO; GO:0005506; F:iron ion binding; IEA.
DR   GO; GO:0006118; P:electron transport; IEA.
DR   InterPro; IPR001450; 4Fe4S_ferredoxin.
DR   InterPro; IPR009030; Grow_fac_recept.
DR   PRINTS; PR00353; 4FE4SFRDOXIN.
SQ   SEQUENCE   468 AA;  48281 MW;  BEA6DA42833A7726 CRC64;

  Query Match             39.6%;  Score 221;  DB 2;  Length 468;
  Best Local Similarity   53.3%;  Pred. No. 7.3e-14;
  Matches   40;  Conservative    8;  Mismatches   25;  Indels    2;  Gaps    1;

Qy         17 NAARGICVPCQINRVGSVTNAGDLATLATQCSTQCPTGTALDDGVTDVFDRSAAQCVKCK 76
              ||    |  | :||||    ||: ||:. ||:  |||||||||||  : ||  :||||:
Db        131 NAGASTCTACPVNRVGGALTAGNAATIVAQCNVACPTGTALDDGVTTDYVRSFTECVKCR 190

Qy         77 PNFYYNGGSPQGEAP 91
              ||||||:  |  |
Db        191 LNFYYNGNN--GNTP 203


RESULT 5
Q9GPP0
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